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Posture and Perceived Distress: A Narrative Review of Evidences, Mechanisms, and Physiotherapy Applications

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ABSTRACT

Background: Posture is closely linked to emotional expression and psychological distress, with altered postural alignment and movement patterns commonly observed in individuals experiencing anxiety and depression. While posture has traditionally been viewed as a manifestation of emotional state, emerging evidence suggests that it may also play an active role in modulating distress.

Objective: This narrative review aims to synthesize existing evidence on the relationship between posture and perceived distress, examine proposed physiological and psychophysiological mechanisms, and discuss implications for physiotherapy practice.

Methods: A narrative synthesis of experimental, observational, and clinical studies was undertaken, drawing from psychology, neuroscience, and movement science literature. Studies examining postural alignment, movement patterns, and posture-based interventions in relation to emotional and stress-related outcomes were reviewed.

Results: Evidence indicates that contractive or slumped postures are associated with increased negative affect, fatigue, and psychological distress, whereas upright or expansive postures are linked to improved mood, self-perception, and stress regulation. Proposed mechanisms include autonomic regulation, interoceptive awareness, cognitive–affective processing, and context-dependent neuroendocrine responses. However, findings related to hormonal changes remain inconsistent, suggesting that posture-related benefits are more reliably mediated through autonomic and cognitive pathways. Notably, the majority of existing studies have not been led by physiotherapists, despite posture and movement being central to this profession.

Conclusion: Posture appears to contribute to perceived distress through multiple interacting mechanisms, although effects are modest and context dependent.

Physiotherapists, with expertise in posture assessment, motor relearning, and biopsychosocial rehabilitation, are uniquely positioned to translate this evidence into structured postural exercise programs. Such interventions may serve as accessible, non-invasive, and low-cost adjuncts to conventional psychological therapies. Future physiotherapy-led randomized controlled trials are warranted to establish efficacy, develop standardized protocols, and examine long-term outcomes of posture-based approaches for distress management.

Keywords: Posture, Perceived distress, Physiotherapy, Stress, Anxiety, Embodiment, Postural exercise.

INTRODUCTION

Perceived distress including stress, anxiety, and depressive symptoms has become a pervasive concern affecting individuals across personal, professional, and social domains. The growing global burden of psychological distress impacts quality of life, productivity, and overall well-being. Chronic stress and emotional strain are associated with a range of adverse outcomes, including impaired cognitive function, autonomic imbalance, somatic symptoms, and reduced social participation.[1,2] Consequently, identifying accessible and sustainable approaches to manage and prevent distress has emerged as a pressing public health and clinical priority. A wide variety of interventions such as mindfulness-based programs, progressive muscle relaxation, yoga, and resilience training have demonstrated effectiveness in reducing stress and promoting psychological well-being.[3–7] However, these approaches often require structured training, sustained practice, or professional facilitation, which can limit their scalability and accessibility in routine clinical or community contexts. This highlights the need for complementary strategies that are simple, non-invasive, and easily integrated into daily life without specialized equipment or extensive supervision.

Posture represents one such modifiable and underutilized avenue. Traditionally conceptualized within physiotherapy as a biomechanical and musculoskeletal construct[8], posture is increasingly recognized for its psychophysiological significance. Psycho-motor disturbances were primary diagnostic indicators of psychological distress in the neo Kraeplin era, where it was noted that depressed person appeared fatigued, took small steps, adopted a slumped posture, and were somewhat motionless and unresponsive (Kraeplin, 1968). Embodiment theories of emotion assume a complex reciprocal relationship between the bodily expression of emotion and the way in which emotional information is processed. Emotion and mental attitude have profound effect upon the nervous system as a whole. Depressed and Anxious individuals tend to have slower gait, slumped posture, and less steadiness when walking than normal individuals.[8] Joy, Winning, Happiness, Success and confidence are stimulating and are reflected by an alert posture in which position of extension predominates. Conversely, Unhappiness, Conflict, feeling looser and inferiority have just the opposite effect and result in postures in which positions of flexion are most conspicuous. [9] The persistent feeling of worries, sadness or loss of interest that characterizes anxiety and major depression can lead to chronic postural changes.

It is certain that the mental attitude affects the physical, either temporarily or

permanently. Is it not possible that this can also happen in reverse? Can not a physical attitude adopted consciously affect the mental attitude? Despite these insights, posture-based interventions remain largely overlooked within physiotherapy research and practice. To date, there are no standardized physiotherapy-led protocols that systematically integrate postural awareness, expansion, and re-education for distress management. Given physiotherapists' expertise in posture correction, motor relearning, and holistic biopsychosocial rehabilitation, the profession is uniquely positioned to develop, test, and implement such interventions. This narrative review therefore aims to synthesize current evidence on the relationship between posture and perceived distress, elucidate the underlying physiological and psychological mechanisms, and explore potential applications of postural exercise within physiotherapy practice.

MATERIALS & METHODS

Study Design

This review was designed as a narrative review aimed at synthesizing current evidence on the relationship between posture and perceived distress, elucidating the underlying mechanisms, and exploring physiotherapy-led applications. Unlike systematic reviews, this approach emphasizes conceptual integration and critical interpretation of findings across diverse study designs and disciplines, including psychology, neuroscience, and physiotherapy. The review followed methodological principles for narrative synthesis recommended by Green et al. (2006) and Ferrari (2015), ensuring transparency and thematic coherence.[10,11]

Search Strategy

A comprehensive literature search was conducted between January and August 2025 across major databases PubMed, Scopus, Web of Science, Cochrane Library, and Google Scholar. Search terms and Boolean operators combined keywords such as:

posture OR body alignment OR gait OR power pose AND distress OR anxiety OR depression OR stress OR affect OR emotion AND physiotherapy OR rehabilitation OR exercise OR embodiment

Additional manual searches were performed using reference lists of included articles, key reviews, and seminal works on embodiment and posture.

Eligibility Criteria

Studies were included if they met the following criteria:

1. Investigated posture, gait, or body expansion/contraction in relation to perceived distress, stress, anxiety, or depression.
2. Examined underlying physiological, neuroendocrine, autonomic, or cognitive-affective mechanisms.
3. Discussed or evaluated posture-based, exercise-based, or physiotherapy-relevant interventions.
4. Included human participants from either clinical, student, or general populations.
5. Published in English in peer-reviewed journals between 2000 and 2025**.**

Exclusion criteria included:

1. Animal studies or purely biomechanical research without psychological outcomes.
2. Conference abstracts, commentaries, or editorials lacking empirical data.
3. Non-English publications without accessible translation.

RESULT

Data Extraction and Synthesis

A total of 375 records were identified. After removing 75 duplicates, 300 unique records remained. An initial relevance check excluded 80 obviously unrelated records, leaving 220 for title and abstract screening. During this step, 130 studies were excluded primarily for wrong population, irrelevant outcomes, or unsuitable study design. Ninety full-text articles were reviewed for eligibility, of which 71 were excluded based on detailed criteria such as population mismatch, insufficient outcome data, overlapping reports, unavailability of full text, or methodological limitations. Ultimately, 19 studies met all inclusion criteria and were incorporated into the narrative synthesis, highlighting:

- Theoretical underpinnings (embodiment and psychophysiological models).
- Summary of evidences examining posture and gait characteristics in individuals with distress or mood disorders and testing the effects of expansive and contractive posture on psychological and physiological outcomes.
- Physiotherapy-related and Complementary Approaches including Yoga, Relaxation, body awareness intervention with postural components
- Relevance to Physiotherapy: The Physiotherapy Perspective
  Where systematic reviews or meta-analyses were available, their conclusions were prioritized for interpretive synthesis.

DISCUSSION

Theoretical Background: Embodiment and Posture

The relationship between posture and emotion has long been recognized within psychology, physiology, and rehabilitation sciences. Embodiment theories emphasize a reciprocal interaction between bodily expression and emotional processing, wherein emotional states shape posture and movement patterns. Individuals experiencing depression or anxiety commonly demonstrate slumped posture, reduced gait speed, diminished arm swing, and altered postural control, whereas positive emotional states such as confidence and vitality are associated with upright, expansive postures characterized by spinal extension and openness.[8]

Importantly, embodiment frameworks propose bidirectionality in this relationship: posture is not only an expression of emotional state but may also act as a modulator of affect and perceived distress. Consciously adopting upright or expansive postures may influence emotional experience by altering physiological regulation, bodily awareness, and cognitive appraisal. This bidirectional model forms the theoretical basis for posture-based interventions targeting distress.

Several interrelated mechanisms have been proposed to explain how posture may influence emotional states. Neuroendocrine theories suggest that expansive postures may signal dominance and safety, potentially modulating stress-related hormonal systems such as the hypothalamic–pituitary–adrenal axis, although empirical support for consistent endocrine effects remains mixed.[12,13] Autonomic regulation models propose that upright posture enhances parasympathetic activity, reflected by improved heart rate variability, thereby supporting emotional regulation and stress resilience.[14] Additionally, interoceptive frameworks posit that posture alters awareness of internal bodily signals, influencing

emotional regulation and anxiety perception.[15] Finally, cognitive–affective theories suggest that posture shapes self-perception, confidence, and attentional focus, with upright postures facilitating positive appraisal and slumped postures reinforcing negative self-evaluative patterns.[16]

Together, these theoretical perspectives provide a multidimensional framework for understanding how posture may influence perceived distress. The following section critically reviews empirical studies examining these mechanisms and evaluates the strength of evidence supporting posture-based approaches in distress regulation.

Summary of evidences examining and testing the effects of expansive and contractive postures.

Michalak et al. (2009)[8]**,** conducted experimental observation study and examined gait patterns using motion capture technology while individuals walked on a treadmill. Kinematic analyses focused on parameters such as arm swing, head position, speed, and vertical movement amplitude in Healthy adult volunteers with varying mood states. This study concluded that dysphoric or sad mood walked with reduced speed**,** less arm swing**,** slumped posture, and lower vertical movement a gait pattern characterized as contractive and withdrawn. However, study conducted in Laboratory setting may not represent natural walking behaviour moreover Mood was induced or self-reported rather than clinically diagnosed depression, reduce its clinical applicability and generalizability due to small sample size.

Canales et al[17]. investigated postural characteristics and body image perception in individuals with Major Depressive Disorder (MDD) compared with healthy controls in a cross-sectional study conducted at the Institute of Psychiatry, University of São Paulo, Brazil. Postural alignment was assessed using photogrammetry, while body image perception and depression severity were evaluated using standardized questionnaires, including the Body Image Assessment Scale and the Hamilton Depression Rating Scale (HAM-D). The study found that participants with MDD demonstrated a significantly more slumped posture, marked by forward head position, rounded shoulders, and reduced thoracic extension, along with altered body image perception. These findings suggest that depressive symptoms are reflected in both physical posture and self-perception. However, the small sample size and cross-sectional design limited statistical power, causal inference, and the absence of longitudinal follow-up.

Feldman et al. (2020)[18] conducted a comparative observational study in Israel to evaluate gait, balance, and postural differences among individuals with major depressive disorder, anxiety disorders, and schizophrenia compared with healthy controls. Using motion analysis and force platform assessments, the study demonstrated significant motor impairments across all psychiatric groups. Depressed individuals showed slower gait and stooped posture, those with anxiety exhibited increased postural sway, and individuals with schizophrenia demonstrated pronounced motor disorganization. These findings provide Level II evidence supporting altered motor patterns as physical manifestations of psychiatric illness. However, small and unequal sample sizes, potential medication effects, and the cross-sectional design limited causal and longitudinal interpretation.

Carney et al.[12] in 2010 conducted experimental Research utilized a robust methodology, randomly assigning forty-two participants to either brief high-power (expansive) or low-power (contractive) pose conditions to causally test whether nonverbal displays could produce power. The findings confirmed predictions across psychological, behavioural, and physiological domains: high-power posers showed an adaptive neuroendocrine profile of elevated testosterone and decreased cortisol, increased self-reported feelings of power, and significantly higher risk tolerance. Critically, the use of random assignment and multiple objective outcomes (hormones, risk task) strengthens the causal inference of the manipulation, though the authors acknowledge a gap, noting that the specific role of expansiveness and the generalizability of the specific poses require further investigation.

In an effort to replicate and extend earlier findings on the effects of expansive postures, Ranehill et al.[13] (2014) conducted a large preregistered experimental study examining whether brief power poses influence hormonal activity and risk-taking behaviour. In this study, male and female participants were randomly assigned to adopt either expansive, high-power postures or contractive, low-power postures for a brief, standardized period, comparable to protocols used in initial embodiment research. Hormonal markers, including testosterone and cortisol, were assessed alongside behavioural measures of risk tolerance before and after the intervention. Contrary to influential early reports, their findings indicated no significant changes in endocrine responses or risk-taking behaviour as a function of posture**,** suggesting that previously reported effects may not be robust. The authors highlighted that earlier evidence might have been shaped by small sample sizes, publication bias, or methodological artifacts**,** and their results contribute to a growing body of literature challenging the reliability of immediate biological and behavioural effects of power posing. Despite the strengths of a large sample and preregistered design, the study's focus on brief, laboratory-based interventions and short-term outcomes may limit the ability to detect subtler or longer-term embodiment effects.

"Review and Summary of Research on the Embodied Effects of Expansive vs. Contractive Nonverbal Displays,[19] serves as a Commentary summarizing the results of 33 independent published experiments on nonverbal expansiveness. The review confirms that the authors' original 2010 experiments demonstrated that expansive postures increase subjective feelings of power, risk tolerance, and testosterone while decreasing cortisol. However, the critical appraisal is spurred by a conceptual replication by Ranehill et al. (2014) which found only effects on subjective feelings of power but no effect on risk tolerance or hormones.

The authors of the review identify several critical variables that should be the focus of future research to fully understand the embodied effects of expansive nonverbal displays. Hypothesis Awareness: A crucial avenue for future research is investigating the effects of awareness of the experiment's hypothesis. The review notes that virtually all published reports demonstrating significant effects of expansive posture utilized elaborate cover stories to conceal the experimental goal and distract participants. This suggests that awareness of the hypothesis may be a moderator. Ranehill et al. (2014) notably informed participants

that the study examined how physical position affects hormone levels and behaviour, which may have contributed to their varied results compared to the original Carney et al. (2010) study, which used a detailed cover story. Length of Time in Posture**:** Another area requiring direct testing is the length of time participants hold the expanded posture. The original Carney et al. experiments used postures held for only 2 minutes. The authors explain that longer expressions, such as the 6 minutes used in Ranehill et al.'s study, may be problematic. Holding poses for too long may cause discomfort, become awkward, or potentially habituated a body to the intended effects. This opens the avenue for physical therapist to design the expanded posture protocol for future study. Experimenter Blindness **-**The authors also highlight that experimenter blindness to the experiment's hypotheses is a critical variable to explore. This is important given the impact of expectancy effects; Ranehill et al. used blind experimenters, while the Carney et al. team did not, suggesting this difference should be systematically tested.

Huang, Galinsky, Gruenfeld, and Guillory[20] examined whether it is adopting powerful postures or occupying powerful roles that more directly influences cognition and behaviour. Across a series of experimental studies, participants were randomly assigned to either hold expansive or constrictive postures or to enact high- or low-power roles while completing social–cognitive tasks such as action planning, risk-taking decisions, and perspective-taking. The researchers found that powerful roles reliably produced effects on thought and behaviour**,** including greater action orientation and reduced inhibited cognition, whereas postural manipulations alone did not consistently generate power-related outcomes**.** These results suggest that social power, rather than bodily posture per se, is a more proximal predictor of psychological states and behaviour**.** Key limitations include reliance on short-term laboratory tasks**,** relatively brief posture exposure, and student samples, which may limit ecological validity. Additionally, the findings do not directly address whether posture effects might emerge under different durations, contexts, or physiological measures.

The systematic review and meta-analysis by Elkjaer et al.[21] (2022) aimed to evaluate how expansive and contractive body postures and movements influence emotional and behavioural responses. Study Conducted by an international team from Denmark, Germany, and the United States and the study synthesized experimental evidence from multiple trials indicated that expansive postures produced small but significant increases in feelings of power and positive affect, while effects on behaviour were inconsistent. The authors highlighted methodological variability, small sample sizes, and publication bias as key limitations, concluding that posture has only modest and context-dependent effects on affective experiences.

Smith and Apicella[22] conducted an experimental study to test whether adopting *expansive "power poses"* after a competitive task influences testosterone levels**,** cortisol**,** and risk-taking behaviour**.** Participants first engaged in a rigged competition (some assigned as "winners," some as "losers"). Immediately afterward, they were randomly assigned to hold either expansive (power) or contractive (low-power) body postures. Hormonal samples (salivary testosterone and cortisol) were collected before and after the posture manipulation, and participants completed a standardized risk-taking task**.** Power Pose

Condition**:** Open, expansive posture held for two minutes**.** Low-Power Pose Condition: Closed, constricted posture for the same duration. The study found no significant effects of power posing on testosterone**,** cortisol, or risk-taking, regardless of whether participants had won or lost the competition. Competition outcome (win vs. loss) produced some hormonal shifts, but power posing did not modify or amplify those effects. Overall, results provide no support for the claim that brief expansive postures alter hormones or behaviour.

Laborde, Strack, and Mosley[23] conducted an experimental laboratory study to investigate whether adopting expansive ("high-power") versus contractive ("low-power") postures influences cardiac vagal activity using heart rate variability (RMSSD). Participants were randomly assigned to hold either posture for about two minutes, with HRV measured before, during, and after the pose, along with self-reported feelings of power. The study found no significant increase in vagal activity following high-power poses, and in some cases low-power poses showed slightly higher HRV, challenging claims that expansive postures enhance parasympathetic regulation. Psychological perceptions of power also did not change consistently. The brief duration of posing, modest sample size, sensitivity of HRV to small breathing variations, and limited ecological validity suggesting that short power poses may not reliably influence physiological calmness.

Weineck and Pollatos[24] conducted a small pilot within-subject experimental study to explore whether brief adoption of powerful (expansive) body postures could influence interoceptive ability. Participants held expansive or neutral postures for approximately 1–2 minutes, and interoception was assessed using a heartbeat perception task, with anxiety measured as a secondary outcome. The findings suggested that powerful postures were associated with improvements in interoceptive accuracy**,** providing preliminary support for embodiment effects. However, effects on anxiety were exploratory, and the authors emphasized the pilot nature of the study. Limitations included the small sample size, short posture duration, and the absence of a clinical or physiotherapy-based intervention framework, limiting generalizability.

Michalak, Mischnat, and Teismann[25] (2014) conducted an experimental study to examine how sitting posture influences depressive memory bias. Participants were randomly assigned to adopt either a slumped, depressive posture or an upright, erect posture while completing memory tasks. The researchers assessed recall of positive and negative words to determine whether posture affected cognitive processing linked to depression. The results showed that individuals in a slumped posture recalled significantly more negative words and fewer positive words, indicating a stronger depressive memory bias. In contrast, the upright posture reduced this negative recall pattern and supported more balanced memory processing. Limitations include the use of a brief, artificially induced posture that may not reflect natural daily posture habits, a relatively small sample size limiting generalizability, and reliance on short-term cognitive outcomes rather than long-term emotional or behavioural measures. Additionally, the study focused on healthy participants rather than clinically depressed individuals, limiting clinical applicability.

Wilkes, Kydd, Sagar, & Broadbent[26] conducted a randomized experimental study to examine whether adopting an upright sitting posture (vs. a slumped posture) could

improve affect and fatigue in individuals with mild-to-moderate depressive symptoms. Participants were randomly assigned to sit in an upright or slumped posture while completing a stressful task and mood assessments. Posture was standardized using visual and verbal guidance. This study found that the upright posture group showed significantly improved affect, reduced fatigue, and more positive self-statements compared to the slumped posture group. Study suggest that posture can influence emotional experience in people with depressive symptoms. However, the sample size was relatively small, the effects were short-term, and posture was held only briefly in a controlled laboratory setting, limiting real-world applicability. In addition, the study did not include long-term follow-up or physiological measures to confirm underlying mechanisms.

Davis et al.[27] (2017) conducted a randomized controlled trial to test whether holding brief expansive "power poses" before public-speaking exposure could improve outcomes in individuals with Social Anxiety Disorder. Participants were assigned to either a power-posing group or a neutral-posture control group and held their respective poses for a short duration before each exposure session. The results showed no significant benefits of power posing on anxiety reduction, self-confidence, or speech performance, indicating that power poses did not enhance exposure therapy. The study's limitations include the very short pose duration, the possibility that neutral poses also had calming effects, reliance on self-report measures, and limited generalizability to non-clinical populations.

Nair et al.[28] (2015) conducted a randomized controlled trial to examine whether upright versus slumped sitting postures influence stress responses during a psychological stress task. Participants were randomly assigned to sit in either an upright posture (straight spine, open chest) or a slumped posture (rounded shoulders, flexed spine) while completing a stressful mental arithmetic task. Stress outcomes were assessed using self-reported affect, perceived stress, and physiological markers such as heart rate. The study found that participants in the upright posture reported higher self-esteem, better mood, and lower fear, while the slumped posture was associated with more negative affect and greater stress experience. Physiologically, differences were modest but generally suggested a more adaptive response in the upright group. However, relatively small sample size, brief posture manipulation by physiotherapy tape, and the laboratory setting, which may not reflect natural daily posture and limit the ecological validity.

Gronau et al[29]. (2017) conducted a Bayesian model-averaged meta-analysis to evaluate whether power posing reliably increases the subjective feeling of power. Using both informed priors (derived from earlier theoretical claims) and default priors, the authors synthesized data from multiple experimental studies examining expansive versus contractive postures. Their analysis found little to no evidence that power poses meaningfully increase felt power, and Bayesian estimates consistently favoured the null effect across models. The study concluded that the power-pose effect on subjective power is weak, inconsistent, and not supported by robust evidence. Key limitations include reliance on the quality and heterogeneity of included studies**,** potential publication bias in early power-posing research, and variability in pose duration and measurement methods across studies.

Weineck et al. (2020)[30] conducted a randomized controlled study comparing the effects of powerful versus neutral postures on university students. Participants in the expansive posture group adopted upright, open body positions twice daily for two weeks. The study found that a single session of powerful postures increased interoceptive accuracy, while repeated practice over two weeks significantly reduced state anxiety compared with the neutral posture group. This suggests that expansive postures may enhance bodily self-awareness, thereby promote improved emotional regulation and reduce psychological distress. By directly linking posture with interoceptive processing, it provides a unique physiological and psychological pathway explaining how bodily displays may influence mental states. while improvements in interception were observed, the mechanisms underlying this change whether due to attentional focus, increased confidence, or altered autonomic feedback remain unclear. Longer-term studies with diverse populations are needed to confirm whether these benefits persist and translate into clinically meaningful reductions in distress.

The existing literature indicates that contractive postures are reliably associated with increased perceived distress and depressive symptomatology, while upright, open postures appear to exert modest but consistent benefits on affect, cognition, and stress perception. Although early claims regarding expansive "power poses" producing robust hormonal and behavioural changes are not strongly supported by replication and meta-analytic evidence, posture remains a meaningful embodied correlate of psychological state. From a physiotherapy perspective, these findings support the integration of postural awareness, upright positioning, and movement-based interventions as adjunctive strategies in distress management. Future research should prioritize standardized posture protocols, clinically relevant populations, longer-term interventions, and multidisciplinary designs to clarify mechanisms and optimize physiotherapy applications in mental health care.

Complementary Approaches, Postural Exercise & Alternative Therapies

While posture-specific interventions in physiotherapy are limited, evidence from related mind–body and relaxation-based interventions demonstrates that physical positioning, awareness, and movement can significantly influence psychological outcomes. These findings indirectly strengthen the rationale for developing posture-centred exercise programs for distress management.

Mind body intervention: Yoga, Tai Chi, and mindfulness-based stress reduction (MBSR) are among the most extensively studied non-pharmacological approaches for stress and anxiety. These practices integrate posture, controlled breathing, and attentional focus, producing both psychological and physiological benefits. De Vibe et al.[3] demonstrated in a randomized controlled trial that MBSR improved stress, resilience, and well-being in medical and psychology students. Ciezar-Andersen et al.[7], in a systematic review, confirmed that yoga interventions significantly reduce anxiety and distress among healthcare professionals and students. Song and Lindquist[4] showed that mindfulness-based stress reduction reduced depression, anxiety, and stress among nursing students. These Mind–body practices modulate the hypothalamic–pituitary–adrenal (HPA) axis, improve autonomic balance (parasympathetic

activation, HRV), and enhance interoceptive awareness. Literature suggest Strong evidence from systematic reviews and RCTs. But Limitations are Multifactorial interventions (breath, meditation, community support) make it difficult to isolate posture as the active ingredient.

Relaxation-Based Interventions: Relaxation strategies such as progressive muscle relaxation and structured support groups also demonstrate robust effects on stress and anxiety reduction. Torabizadeh et al.[5] reported significant reductions in anxiety among nursing students using progressive muscle relaxation compared with support groups. Shah and Vaghela[6] showed that relaxation training significantly reduced depression, anxiety, and stress in physiotherapy students, highlighting feasibility within educational settings. Relaxation techniques decrease sympathetic arousal, reduce muscle tension, and promote parasympathetic dominance, indirectly influencing posture and body awareness. Positive points of relaxation-based intervention are they are Easy to implement, safe, and low cost. however, Evidence largely comes from student populations; few studies examine clinical cohorts or integrate relaxation with structured posture training.

Other therapeutic modalities demonstrate additional support for the role of the body in regulating psychological states. Patterson[31] reported that emotional freedom techniques reduced stress and anxiety among nursing students. Wiegand et al.[32] demonstrated that osteopathic manipulative treatment decreased fatigue, stress, and depression among medical students. Baste and Gadkari[33] demonstrated that music therapy reduced perceived stress and improved self-esteem among medical students**,** highlighting the role of non-pharmacological, body–mind approaches in distress management. These approaches work partly through somatic feedback, body awareness, and autonomic regulation. these techniques are Novel and holistic, showing feasibility in student and trainee populations. However**,** Evidence base is still small; methodological rigor varies.

Synthesis and Relevance to Physiotherapy: The Physiotherapy Perspective:

Although not strictly posture-specific, these interventions share a common principle: bodily engagement influences psychological well-being**.** Postural alignment, muscle activation, and awareness of body position play an essential role in these therapies. The consistent benefits observed across yoga, relaxation, and manipulative therapies indicate that structured postural exercise programs could be a safe, accessible, and physiotherapy-led innovation for addressing distress.

No existing treatment protocol in physiotherapy systematically integrates postural awareness, power poses, and body-expansion exercises as a dedicated strategy for stress and anxiety management. Designing and testing such interventions remains an urgent research opportunity.

Physiotherapists occupy a unique position in health care because their professional practice inherently integrates movement, posture, body mechanics, and patient-centred interaction**.** Unlike most healthcare professionals, physiotherapists routinely spend extended time with patients, observing not only biomechanics and pain but also the emotional and psychological states that influence physical functioning. This dual focus makes physiotherapy especially well-suited to develop and apply

posture-based strategies for distress management.

Physiotherapists are trained to analyse, correct, and retrain posture in diverse clinical conditions, including musculoskeletal, neurological, and cardiorespiratory disorders. Techniques such as motor relearning programs**,** core stabilization**,** and postural re-education aim not only to restore physical alignment but also to improve confidence, body image, and functional independence. When extended to mental health, these same skills could be adapted to systematically test whether upright, expansive, or corrective postures reduce perceived distress.

Evidence suggests that posture is closely linked with mood, fatigue, and cognitive appraisal. Physiotherapists, through repeated patient contact and therapeutic alliance, are often able to recognize signs of low self-efficacy, catastrophizing, or depressive affect that manifest in postural habits. Unlike psychologists who focus primarily on cognition, physiotherapists combine psychosocial awareness with hands-on interventions, making them well-positioned to bridge the mind–body interface.

Routine physiotherapy sessions often last 30–60 minutes and involve continuous assessment of movement and alignment. This extended contact allows physiotherapists to notice subtle postural cues (stooping, guarded movement, asymmetry) that may reflect underlying distress. Moreover, the process of guiding patients through corrective exercises and functional training naturally provides opportunities to introduce posture-based awareness and expansion strategies in a non-stigmatizing way.

Potential Physiotherapy Interventions Based on the synthesized evidence, several physiotherapy-driven approaches emerge as promising strategies for managing perceived distress through posture modulation. Posture awareness education can help patients recognize the reciprocal relationship between posture and mood, much like ergonomic or gait retraining programs. Postural expansion training, incorporating upright and “power pose” drills during warm-up or cool-down phases, may enhance body confidence, self-efficacy, and emotional regulation. Furthermore, integrated stress management protocols that combine postural correction with controlled breathing, biofeedback, and relaxation techniques can holistically address both physical alignment and autonomic balance. Extending these principles to community offers an opportunity to promote resilience and stress reduction in a population particularly vulnerable to psychological distress.

Physiotherapy as a discipline offers distinct advantages for such interventions: it is safe, non-invasive, low-cost, and inherently focused on holistic care within the biopsychosocial model. However, despite a strong theoretical foundation and indirect support from mind–body and relaxation-based interventions, there remains no standardized physiotherapy protocol specifically targeting posture-based management of distress. This gap underscores the urgent need for well-designed randomized controlled trials to evaluate feasibility, clinical efficacy, and long-term psychological outcomes of posture-centered physiotherapy programs. These findings collectively highlight the untapped potential of physiotherapists to integrate posture-focused exercises into stress and mental health management, bridging the interface between physical rehabilitation and psychological well-being.

The synthesis of existing evidence and emerging physiotherapy applications collectively highlight posture as a viable therapeutic avenue for managing perceived distress, warranting deeper exploration through rigorous clinical research and integration into holistic physiotherapy practice. To advance this nascent field, several research priorities warrant attention. First, the development of standardized, physiotherapy-led intervention protocols is imperative. Such programs should systematically incorporate posture awareness education, the adoption of expansive body postures, and functional re-education within routine physiotherapy practice. These protocols must be feasible, reproducible, and adaptable across diverse populations and clinical settings. Second, rigorous randomized controlled trials involving clinical population such as individuals diagnosed with depression or anxiety and vulnerable population cohorts are necessary to establish causal efficacy, quantify effect sizes, and validate outcome measures. Third, mechanistic investigations should extend beyond behavioral endpoints to encompass physiological markers, neurocognitive indices, and measures of interoceptive awareness, thereby elucidating the pathways through which posture modulates stress and emotion regulation. Furthermore, integrating postural exercise regimens with established resilience and stress-management interventions such as mindfulness, progressive relaxation, or cognitive-behavioral therapy may yield synergistic therapeutic effects. Finally, future research must evaluate long-term outcomes, adherence rates, and real-world implementation within physiotherapy and community health contexts to ensure sustainability and facilitate clinical translation.

CONCLUSION

Postural exercise is a promising, complementary, and non-invasive method for reducing perceived distress. Although psychology and psychiatry provide strong theoretical and experimental support for this approach, physiotherapy has yet to fully embrace this potential. Since physiotherapists have expertise in posture management, motor relearning, and comprehensive patient care, they are well-equipped to develop structured, evidence-based protocols based on these findings. Future investigations spearheaded by physiotherapists ought to prioritize the resolution of existing methodological shortcomings, the development of standardized intervention protocols, and the validation of sustained therapeutic outcomes. Such efforts would enable physiotherapists to broaden their professional scope beyond conventional physical rehabilitation, encompassing the promotion of mental health and thereby facilitating comprehensive biopsychosocial care. Ultimately, interventions centered on posture have the potential to bridge the mind-body divide, providing accessible approaches to bolster resilience and well-being within clinical environments as well as the broader community.

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